

### REMARKS

Claim 1 has been amended to emphasize that the alkyldiketenes and the vinylamine unit containing polymer are added to a surface of paper during an engine sizing step in a papermaking process. An identical house keeping change has been made in Claims 2-6 as a result of the change in Claim 1. The claims before the Examiner remain Claims 1 to 6.

The rejection of Claims 1 to 6 under 35 U.S.C. § 103 as unpatentable over Weisgerber '366 or Mitsubishi Paper Mills JP '555 in view of Phohl et al. '285 or Neissner et al. '340 further in view of Auhorn et al. '348 is respectfully traversed.

The claims (and the invention described in the specification) relate to an improvement in the engine sizing of paper. Engine sizing is a surface sizing and is different from techniques such as internal sizing discussed below. (Claim 1 thus now calls for the addition of the alkyldiketenes and a vinylamine unit-containing polymer "to a surface of paper during an engine sizing step of a papermaking process.") Applicants have found that the use of a polymer with vinylamine units and the characteristics as recited in Claim 1 will increase the rate of development of sizing; see page 1, lines 19-21 discussing prior art cationic polymers acting as promoters by increasing the rate of development of sizing and the sentence at lines 5 and 6 of page 1 reading "The present invention relates to the use of polymers as promoters for the engine sizing of paper with alkyldiketenes." Although it was known that alkyldiketene dispersions can be used in the engine sizing of paper, the drawback associated with their use is that a full sizing effect is not developed until the sized papers had been stored for at least twenty-four hours; see the discussion in the specification at page 1, lines 7 to 14 reading

Aqueous alkyldiketene dispersions which are stabilized with cationic starch or with anionic emulsifiers are commercial engine sizers for paper. The full sizing effect of the paper sized with alkyldiketene dispersions is not developed until the sized papers are stored. Such papers therefore cannot be further processed, for example treated with coating strips, or printed on

immediately after papermaking. Rather, they must be stored for at least 24 hours until a sufficient sizing effect has developed.

The present invention overcomes the drawbacks of engine (surface) sizing using alkyldiketenes alone.

As acknowledged in the Office Action at page 2, Weisgerber '366 discloses the internal sizing of paper using alkylketene dimers and polymers having vinylamine units. The patentee discloses that the components are added to the pulp for internal sizing and there is no discussion in the reference that polymers with vinylamine units can act as a promoter for dialkylketenes in an engine (or surface) sizing operation. An internal sizing is added to a paper pulp while an engine (surface) sizing is added to a surface of a paper made from a paper pulp. Weisgerber '366 specifically mentions "internal sizing" at least at column 1, lines 15-16 and 34. See also claim 1 of the reference calling for "admixing with the aqueous suspension of paper pulp an aqueous ketene dimer emulsion and polyvinylamine."

JP '555 describes the use of N-vinylformamide-vinylamine copolymers as a fixing agent during a paper manufacturing process. The Examiner acknowledges that the reference shows "an internal sizing material"; see the next to last paragraph at page 2 of the Office Action. A fixative is intended to fix undesirable substances on the fibrous structure of the paper and therefore a fixative is not a promoter. JP '555 does not describe or suggest use of the copolymer in a process as claimed here. Furthermore, the reference does not disclose the use of such copolymers in combination with alkylketenes. In addition, the abstract clearly shows that the fixing agent is calculated based upon the wt.% of solid pulp and that the resulting product is "a sheet of raw paper covered with polyolefin resin on both sides." This product surely is not a candidate for engine sizing. Thus, JP '555 does not teach or suggest the use of the claimed materials in the engine sizing step of a papermaking process.

Phohl et al. '285 describes polymers derived from the copolymerization of N-vinylformamide with ethylenically unsaturated monomers such as vinyl acetate to increase

the dry and wet strength of paper. The Examiner so acknowledges; see page 3, lines 1-3 of the Office Action. There is no mention of the use of such polymers as promoters for alkyldiketenes in any context. There is no recognition in the reference of using such polymers as promoters for dialkylketenes during an engine sizing treatment.

Niessner et al. '342, as Phohl et al. '285, discloses polymers containing vinylamine units as dry strength enhancers (for paper, paperboard, and cardboard) but there is no recognition in this reference of the use of such polymers with alkyldiketenes during an engine sizing operation. The reference discloses adding the polymers to paper stock prior to drainage; see column 5, lines 63-67. This treatment is not an engine sizing treatment.

Auhorn et al. '348 discloses polymers containing vinylamine units as retention aids. This reference, as Phohl et al. '285 and Niessner et al. '340, does not disclose or suggest the use of such polymers as a promoter for alkyldiketenes when used as a sizing agent in a papermaking process. The discussion in the reference at column 2, lines 34-37 of various uses of polymers that contain vinylamine units does not direct a person of ordinary skill in the art to the invention claimed here. Accordingly, the rejection should be withdrawn.

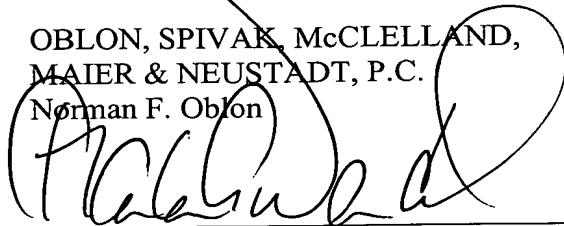
The Examiner is thanked for acknowledging that a certified copy of the priority document has been received from the international bureau and for listing references submitted with an Information Disclosure Statement.

In view of the foregoing revisions and remarks it is respectfully submitted that the application is in condition for allowance and a USPTO paper to those ends is earnestly solicited. The Examiner is requested to telephone the undersigned of additional changes are required in the case prior to allowance.

Respectfully submitted,

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A large, stylized handwritten signature in black ink, likely belonging to Charles A. Wendel, is written over the printed name and firm name.

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